Alltech® Custom Packed Metal and PTFE Columns

Before ordering a custom-packed GC column, consult the list of popular packed columns on pages 244–245 to see if the column you need is there. Each column comes complete with brass nuts and brass ferrules. For assistance or a quote, please contact Technical Support.

Coiling Schematics

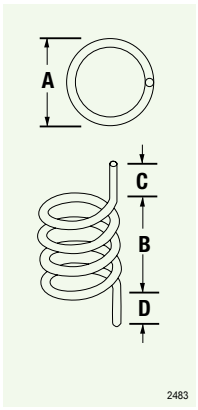


Figure 1

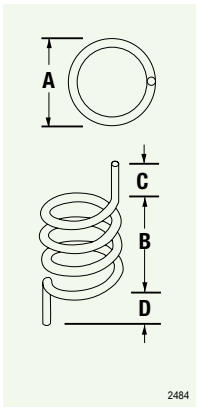


Figure 2

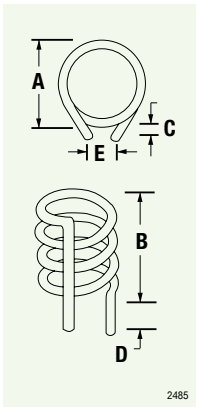


Figure 3

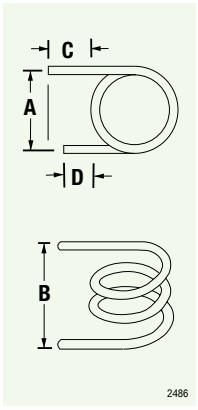


Figure 4

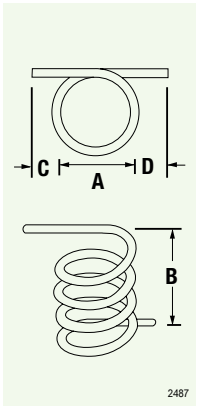


Figure 5

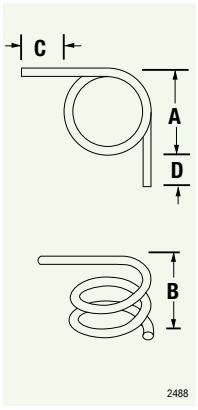


Figure 6

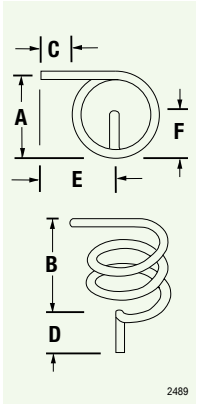


Figure 7

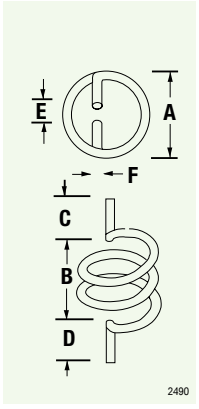


Figure 8

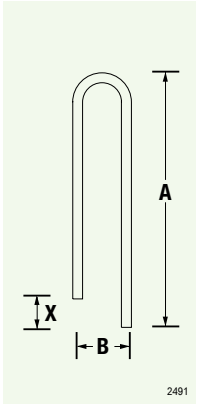


Figure 9

more info

Certain expensive stationary phases and packings may require a surcharge. Be sure to state coiling instructions.

Custom Metal and PTFE Columns — Ordering Instructions

Specify Coiling

1) **Instrument Make and Model:** _____
2) **Configuration Number: (see coiling schematics)** _____
3) **Dimensions:** **A=** _____ in/mm (circle one)
   B= _____ in/mm (circle one)
   C= _____ in/mm (circle one)
   D= _____ in/mm (circle one)
   E= _____ in/mm (circle one)
   F= _____ in/mm (circle one)
   X= _____ in/mm (circle one)
4) **Column Length:** _____ ft/m (circle one)
5) **Column i.d.:** _____ in/mm (circle one)
6) **Column o.d.:** _____ in/mm (circle one)
7) **Tubing Material: (circle one)**
   Stainless Steel AT-Steel Nickel PTFE
   TFE-Coated SS Aluminum Copper
8) **Solid Support:** _____ **Mesh Size:** _____

Specify Packing

Choose either a Pretested Packing (p368–369) or create your own custom (refer to p370–371) by specifying information below:

9) **Stationary Phase A:** _____ **% Loading:** _____
   Stationary Phase B*: _____ **% Loading:** _____
   Stationary Phase C*: _____ **% Loading:** _____
10) **Mirror Image:**
   _____ Please check if a mirror image is required.
11) **Injection Port Design: (circle one)**
   on-column not on-column
12) **Stainless Steel Fittings:**
   _____ Please check if stainless steel fittings are required (PN: C-14010N)
13) **Preconditioning:**
   _____ Please check if column preconditioning is required (PN: C-14005)
14) **Other Special Instructions: (please be specific)**
   _____
   _____
   _____

*Additional charge applies to dual- and triple-coated packings (Part No. **C-14020**).

Custom Packed Columns

Description	Part No.
Custom Packed Columns (Specify all information from Table 1)	**C-5000**
Empty Columns	
Empty Column with Fittings and Ferrules	**C-5100**
Additional Charges (per Column)	
Preconditioned Column	**C-14005**
Stainless Steel Fittings	**C-14010N**
Dual- and Triple-Coated Packings	**C-14020**

Alltech® GC Packed Columns

Custom Deactiglas® Glass

- Silane treated for inertness
- Precision bore glass for reproducibility
- Brass fittings and vespel/graphite ferrules included
- Available packed or empty

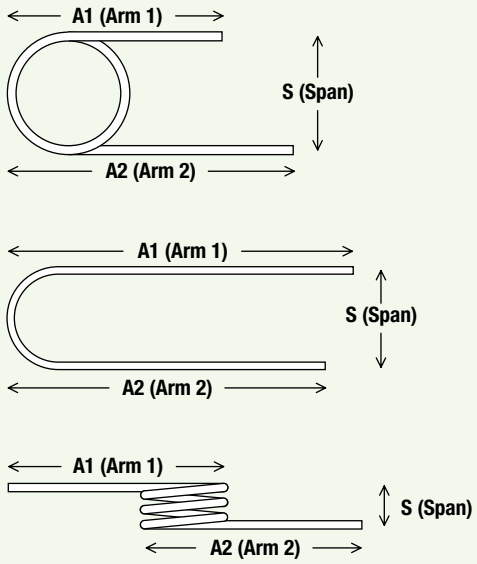
Alltech® Deactiglas® GC Columns are fabricated from precision-bore (2mm ±0.05mm or 4mm ±0.1mm i.d.) glass. All columns are 1/4" o.d. unless otherwise specified. Columns longer than 2 meters may have joints. Several additional services such as stainless steel fittings and preconditioning of the packing are available. Certain expensive stationary phases and packings may require a surcharge.

Due to space limitations we are not able to list all of the different manufacturers columns in our catalog. However, they are still available and can be specified at time of order placement. If you do not see your instrument on the following pages, please call Customer Service.

Special Services for Glass Columns

Description	Part No.
Stainless Steel Fittings (Per Column)	**C-14010N**
Preconditioned Packing (Per Column)	**C-14005**

Key to Configurations for Glass Columns



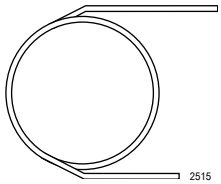
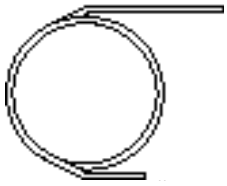
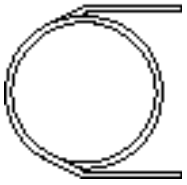
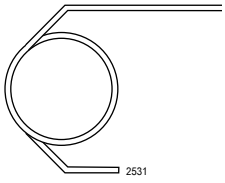
Deactiglas® Column Ordering Instructions:

1. Choose column configuration part no. below.
2. Choose either a pretested packing (p247–248) or create a custom packing (refer to p249–250) by specifying information below:
   Stationary Phase A _____ % Loading _____
   Stationary Phase B _____ % Loading _____
   Stationary Phase C _____ % Loading _____

Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

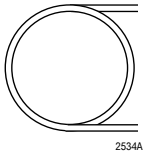
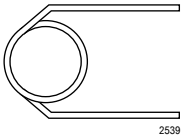
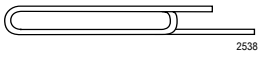
Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
*Agilent 5880, 5890, 5987, 6890**					
	Configuration A On-Column Injection A1 = 11.02" (280mm) A2 = 9.05" (230mm) S = 9" (229mm) FID	3ft	2mm	**130962**	**130961**
		4ft	2mm	**C6082**	**6082**
		4ft	4mm	**C6085**	**6085**
		6ft	2mm	**C6087**	**6087**
		6ft	4mm	**C6089**	**6089**
		2m	2mm	**C6336**	**6336**
		2m	4mm	**C6343**	**—**
		8ft	2mm	**C6347**	**6347**
		1.8m	3mm	**C6346**	**6346**
		10ft	2mm	**C6091**	**6091**
		10ft	4mm	**131552**	**131551**
	Configuration B On-Column Injection A1 = 11.02" (280mm) A2 = 7.09" (180mm) S = 9" (229mm) TCD	6ft	2mm	**C6368**	**6368**
		6ft	4mm	**C6391**	**6391**
		1.8m	3mm	**C6346**	**6346**
	Configuration C Not On-Column Injection A1 and A2 = 9.05" (230mm) S = 9" (229mm) All Detectors Use with Liner or Disposable Insert	3ft	4mm	**C6433**	**6433**
		4ft	2mm	**C6436**	**6436**
		4ft	4mm	**C6440**	**6440**
		6ft	2mm	**C6442**	**6442**
		2m	2mm	**C6447**	**6447**
		2m	4mm	**C6449**	**6449**
PerkinElmer® 115, 300, 900, 910, 990, F30, 2000, 2100, 3920, Sigma Series					
	On-Column Injection A1 = 12.62" (321mm) A2 = 7.09" (180mm) S = 8.75" (222mm)	6ft	4mm	**C6151**	**6151**

more info
For explanation of A1, A2, and S, refer to key on page 240.

Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

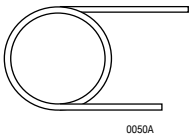
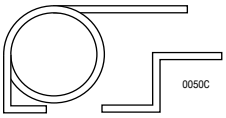
Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
PerkinElmer® 8300, 8400, 8700 Series, 9000 Series, Autosystem					
	Not On-Column Injection A1 = 6.75" (171mm) A2 = 6.75" (171mm) S = 6.5" (165mm)	6ft	2mm	**C6479**	**6479**
		6ft	4mm	**C6482**	**6482**
		2m	2mm	**C6468**	**6468**
Shimadzu® 8A, RIA, GC-8A8IF (No Fittings Included)					
	A1 = 9" (229mm) A2 = 9" (229mm) S = 6" (152mm) 5mm o.d. Tubing	2m	3mm	**C6493**	**6493**
Shimadzu® 7A, 9A, 12A, 14A, 14B, 15A, 16A (No Fittings Included)					
		1m	3mm	**C6497**	**6497**
	A1 = 10.69" (272mm) A2 = 12.81" (327mm) S = 1.57" (40mm) 5mm o.d. Tubing	1.7m	3mm	**C6495**	**6495**

more info
For explanation of A1, A2, and S, refer to page 240.

Alltech® GC Packed Columns

Custom Deactiglas® Glass

Deactiglas® Glass GC Columns (continued)

Chromatograph	Configuration	Length	i.d.	Packed Part No.	Empty Part No.
Varian® 3300, 3400,3600, 3700, 4400, 4600, 6000 Vista Series					
 0050A	Injector A to Detector A A1 = 9.5" (241mm) A2 = 8.1" (206mm) S = 5.5" (140mm) FID	6ft	4mm	**C6192**	**6192**
Varian® Universal Columns 3300, 3400, 3600, 3700, 4400, 4600, 6000 Vista Series					
 0050C	A1 = 9.5" (241mm) A2 = 2.25" (57mm) S = N/A FID, TCD, ECD	6ft	2mm	**C6206**	**6206**

more info
For explanation of A1, A2, and S, refer to page 240.

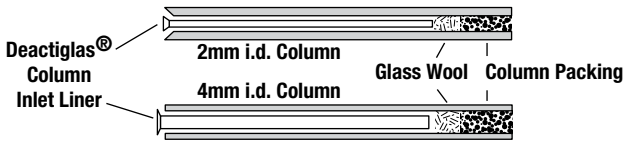
more info
Universal Glass Column Adapters are available for the Varian® 3000 and Varian® 3700/Vista Series. Please contact Customer Service for part numbers and prices.

Hi-EFF™ Pre-Columns

- Extend column life
- Reduce sample clean-up
- Perform reaction chromatography
- Perform subtraction chromatography

Deactiglas® Column Inlet Liners

- Prolong the life of your glass columns
- Silane-treated for inertness
- Available for 2mm or 4mm i.d. columns
- Inserts directly into the end of your column



Hi-EFF™ Pre-Columns

Description	Length	Qty.	Empty Part No.
1/8" SS	6"	6	**5910**
1/8" Bottom-Drilled SS Union	—	ea	**5920**
1/4" Bottom-Drilled SS Union	—	ea	**5921**

Deactiglas® Column Inlet Liners

Description	Qty.	Part No.
For 2mm i.d. Columns	10	**6301**
For 4mm i.d. Columns	10	**6303**
Glass Wool Inserter/Remover	2	**6292**

Alltech® Popular GC Packed Columns

These columns are 6' x 1/8" o.d. 304 premium grade, precleaned stainless steel (unless otherwise indicated). Each column is made with preconditioned, pretested packing and comes complete with fittings, packing quality control chromatogram, column tags, and conditioning instructions.

Popular Packed Column Ordering Instructions:

1. Choose the part no. for your column from pages 244–245.
2. Specify make and model of GC.*
3. If your column is not listed, see page 239 for custom columns.

*If no coiling instructions are provided, we will supply in a nominal 6" coil.

Popular GC Packed Columns

Packing Description	Dimensions*	Part No.
Alumina F-1, 60/80	5' x 1/8" SS Tubing	**5664PC**
10% Carbowax® 20M on Chromosorb® W-AW, 80/100		**12005PC**
10% Carbowax® 20M on Chromosorb® W-HP, 80/100		**12106PC**
0.20% Carbowax® 1500 on Graphpac™-GC, 80/100		**8546PC**
Chemipack C18, 80/100		**2768PC**
Chromosorb® 101, 80/100		**2406PC**
Chromosorb® 107, 80/100	6' x 1/8" TFE Tubing	**9783**
Chromosorb® 750, 80/100	4' x 1/8" SS Tubing	**14480**
Gas Chrom™ 220, 80/100		**2484PC**
Gas Chrom™ 254, 80/100		**2486PC**
HayeSep® D, 80/100		**14487**
HayeSep® D, 100/120	20' x 1/8" Ni Tubing	**27082PC**
HayeSep® D, 100/120	30' x 1/8" SS Tubing	**27083PC**
HayeSep® D, 100/120	10' x 1/8" SS Tubing	**28301PC**
HayeSep® DB, 100/120	30' x 1/8" SS Tubing	**2836PC**
HayeSep® Q, 80/100	8' x 1/8" SS Tubing	**28010PC**
HayeSep® Q, 80/100		**2801PC**
HayeSep® Q, 100/120		**14489**
HayeSep® P, 60/80	8' x 1/8" SS Tubing	**2803PC**
HayeSep® P, 80/100		**2804PC**
HayeSep® T, 60/80	3' x 1/8" SS Tubing	**14491**
HayeSep® T, 80/100		**2813PC**

*6' x 1/8" stainless steel unless otherwise specified.

Alltech® Popular GC Packed Columns (continued)

Popular GC Packed Columns (continued)**

Packing Description	Dimensions*	Part No.
Molecular Sieve 5A (Washed), 60/80		**14494**
Molecular Sieve 5A (Washed), 80/100		**5605PC**
Molecular Sieve 5A (Washed), 80/100	10' x 1/8" SS Tubing	**14495**
Molecular Sieve 13X (Washed), 80/100	3' x 1/8" SS Tubing	**14492**
Molecular Sieve 13X (Washed), 80/100		**5773PC**
Molecular Sieve 13X (Washed), 80/100	10' x 1/8" SS Tubing	**14493**
3% OV™-101 on Chromosorb® W-HP, 80/100		**12019PC**
3% OV™-101 on Chromosorb® W-HP, 100/120		**12700PC**
10% OV™-101 on Chromosorb® W-HP, 80/100		**12703PC**
3% OV™-17 on Chromosorb® W-HP, 80/100		**12719PC**
Porapak® N, 80/100		**2716PC**
Porapak® P, 80/100		**14499**
Porapak® Q, 50/80		**2700PC**
Porapak® Q, 80/100	12' x 1/8" SS Tubing	**27012PC**
Porapak® Q, 80/100		**2701PC**
Porapak® Q, 100/120		**2702PC**
Porapak® QS, 80/100		**2719PC**
Porapak® T, 80/100		**2713PC**
10% SE-30 on Chromosorb® W-HP, 80/100		**12423PC**
Silica Gel Grade 12, 60/80	18' x 1/8" SS Tubing	**5651PC**
Silica Gel Grade 12, 80/100	8' x 1/8" SS Tubing	**14530**
10% Silar™ 10C on Chromosorb® W-HP, 100/120		**12430PC**
Tenax® TA, 60/80	4' x 1/8" SS Tubing	**14538**
Tenax® TA, 60/80		**4900PC**
Tenax® TA, 80/100		**4901PC**
Unibeads™ 2S, 60/80		**2760PC**
Unibeads™ 3S, 60/80		**14541**
VZN-1, 60/80	23' x 1/8" SS Tubing	**84623PC**
10% Silicone UCW-98 on Chromosorb® W-HP, 80/100		**8493PC**

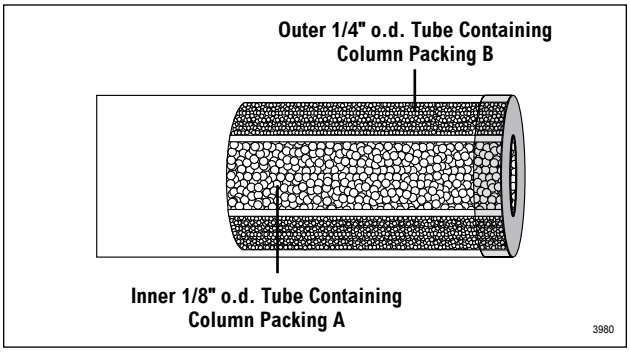
*6' x 1/8" stainless steel unless otherwise specified. **To order, use the part number shown and specify the instrument for which it should be coiled.

Alltech® CTR Concentric Packed Columns

For Gas Analysis

- CTR I is ideal for separating O_2, N_2, CH_4, CO, CO_2 at ambient conditions
- CTR III is ideal for argon analysis in the presence of O_2
- Useful where two separate chromatographic runs are required to analyze one sample
- Individually tested

A CTR column is essentially a column within a column. This permits you to use two different packings for the analysis of your sample. The diagram shows the construction of the CTR column.



Cut-away view of CTR column.

CTR I—Oxygen, Nitrogen, Methane, Carbon Monoxide, and Carbon Dioxide

Until the CTR, no single column operating at room temperature has been designed to permit, in one analysis, all these components in air. The analysis is usually accomplished by separate runs or with expensive valves. The CTR I accomplishes this separation in less than nine minutes.

Calibration Gas for CTR I Column—This special mixture is useful for calibrating Part No. **8700** CTR I columns. It contains approximately 15% CO_2 + 7% CO + 7% O_2 + 4.5% CH_4 with the balance N_2. It is supplied in a 4L push button can with a needle applicator.

CTR III Argon Analysis Column

The CTR III is special designed for the separation of argon in the presence of oxygen. The outer column contains a special adsorbent that removes oxygen allowing the elution of argon and nitrogen. The inner column allows the combined elution of a peak containing oxygen and argon and later nitrogen. This separation is accomplished at ambient temperatures in ten minutes.

more info

For GC Applications, see the GC Applications Section, pages 462–493.

CTR I Column

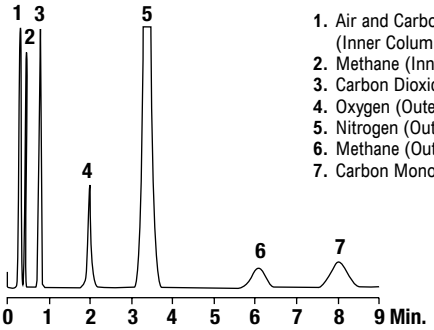
Description	Temp. Limit max.	Part No.
CTR I Column	275°C	**8700**
Calibration Gas for CTR I	—	**9799**

CTR III Column

Description	Temp. Limit max.	Part No.
CTR III Argon Analysis Column	275°C	**8725**
Additional Fittings		
Tube End Connector, 1/4" to 1/8" Tube	—	**14169**

CTR I—Air, CO, CH_4, CO_2, O_2, N_2

CHROM 1059

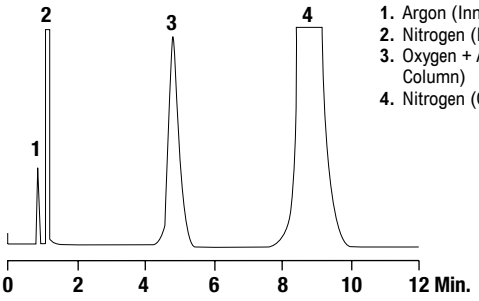


1. Air and Carbon Monoxide (Inner Column)
2. Methane (Inner Column)
3. Carbon Dioxide (Inner Column)
4. Oxygen (Outer Column)
5. Nitrogen (Outer Column)
6. Methane (Outer Column)
7. Carbon Monoxide (Outer Column)

Column: CTR I (Part No. **8700**)
Outer Column: 6ft x 1/4" Packed with Activated Molecular Sieve
Inner Column: 6ft x 1/8" Packed with Porous Polymer Mixture
Temp: Ambient
Carrier Gas: Helium at 65mL/min
Detector: TCD

CTR III—Argon in Air

CHROM 1060



1. Argon (Inner Column)
2. Nitrogen (Inner Column)
3. Oxygen + Argon (Outer Column)
4. Nitrogen (Outer Column)

Column: CTR III, 6ft x 1/4" SS (Part No. **8725**)
Outer Column: 6ft x 1/4" Packed with Activated Molecular Sieve
Inner Column: 6ft x 1/8" Packed with Molecular Sieve and Oxy Adsorbent
Temp: Ambient
Carrier Gas: Helium at 70mL/min
Detector: TCD

Pretested GC Packings

Pretested packings are guaranteed and supplied with a test chromatogram. Preconditioning service is available for 20g or 25g of packing. The packing is heated at 25°C below the upper temperature limit for 3 hours with a flow of oxygen-free nitrogen.

Pretested GC Packings

Packing Description	Temp. Limits	Qty.	Part No.
Alumina F-1, 60/80	300°C	100g	**5664**
1% AT™-1000 on Carbograph™ 1, 60/80	250°C	15g	**1733**
5.0% Carbowax® 20M on Chromosorb® W-HP, 80/100	60–225°C	20g	**16147**
10.0% Carbowax® 20M on Chromosorb® W-AW, 80/100	60–225°C	20g	**12005**
10.0% Carbowax® 20M on Chromosorb® W-HP, 80/100	60–225°C	20g	**12106**
Carbosphere®, 60/80	400°C	5g	**5680**
Carbosphere®, 80/100	400°C	5g	**5682**
Chemipack C18, 80/100	320°C	15mL	**2768**
Chromosorb® 101, 80/100	275/325°C	25g	**16149**
30% DC-200 (500 cstk) on Chromosorb® P-AW, 60/80	20–200°C	25g	**12713**
Gas Chrom™ 254, 80/100	275°C	25g	**2486**

Pretested GC Packings (continued)

Pretested GC Packings (continued)

Packing Description	Temp. Limits	Qty.	Part No.
Molecular Sieve 5A (washed), 60/80	350°C	50g	**5604**
Molecular Sieve 5A (washed), 80/100	350°C	50g	**5605**
Molecular Sieve 13X (washed), 60/80	350°C	50g	**57730**
Molecular Sieve 13X (washed), 80/100	350°C	50g	**57732**
3% OV™-1 on Chromosorb® W-HP, 80/100	100–350°C	20g	**12716**
3% OV™-17 on Chromosorb® W-HP, 100/120	20–350°C	20g	**12017**
3% OV™-17 on Chromosorb® W-HP, 80/100	20–350°C	20g	**12719**
Porapak® PS, 80/100	250°C	15g	**16223**
Porapak® PS, 100/120	250°C	15g	**16224**
Porapak® Q, 100/120	250°C	15g	**16228**
Silica Gel Grade 12, 60/80	350°C	100g	**5651**
Silica Gel Grade 12, 80/100	350°C	100g	**5653**
Tenax® TA, 60/80	350°C	10g	**04916**
Tenax® TA, 80/100	350°C	10g	**04917**
Tenax® GR, 60/80	350°C	10g	**4937**
Unibeads™ 1S, 60/80	200°C	25g	**2752**
Unibeads™ 2S, 60/80	200°C	25g	**2760**
Unibeads™ 3S, 60/80	200°C	25g	**2764**
Unibeads™ 3S, 80/100	200°C	25g	**2766**
VZN-1, 60/80	50°C	10g	**8462**

Custom Coated Packings

Before ordering a custom coated packing, please check the list of stock pretested packings on pages 247–248 (called "Pretested" on these pages). You may find the packing you need in stock and at a savings.

Custom Coated Packing Ordering Instructions:

1. Choose your solid support from Table 1.
2. Specify mesh range.
3. Choose the stationary phase from Table 3 or 4. It is possible to coat up to three stationary phases on one support).
4. Specify % loading for each stationary phase. Note maximum % loading guidelines for each support in Table 2.

Table 1—Base Price for Custom-Coated Packings

Solid Support	20 Grams Part No.	50 Grams Part No.	100 Grams Part No.
Chromosorb® G, W (HP)	**C-3004**	**C-3036**	**C-3068**
Chromosorb® G, W, or P (NAW, AW, DMCS)	**C-3006**	**C-3038**	**C-3070**
Chromosorb® T	**C-3008**	**C-3040**	**C-3072**
Chromosorb® 101-108	**C-2031**	**C-2032**	**—**
Chromosorb® 750	**C-3012**	**C-3044**	**C-3076**
Gas Chrom™ S	**C-3018**	**C-3050**	**C-3082**
Gas Chrom™ R	**C-3020**	**C-3052**	**C-3084**
Gas Chrom™ 220, 254	**C-3022**	**C-3054**	**C-3086**
Graphpac™-GC and -GB (15 grams), Carbograph™	**C-2200**	**—**	**—**
Porapak®	**C-2041**	**C-2042**	**—**
Tenax® or HayeSep® (15 grams)	**C-3028**	**—**	**—**

Table 2—Maximum Stationary Phase Loading for Solid Supports

Max. Load	Supported Material	Max. Load	Supported Material	Max. Load	Supported Material
5%	Chromosorb® G	12%	Chromosorb® 750	2%	Porapak®
15%	Chromosorb® W	15%	Gas Chrom™ S, A, P, Z, and Q	2%	Super Q
25%	Chromosorb® A	30%	Gas Chrom™ R	12%	T-Port-F
30%	Chromosorb® P	2%	Gas Chrom™ 220 and 254	2%	HayeSep®
12%	Chromosorb® T	0.5%	Glass Beads	2%	Tenax®
2%	Chromosorb® 101–108	8%	Graphpac™, Carbograph™	15%	Supelcoport

Stationary Phases

Table 3—GC Stationary Phases

Description	Solvent	Temp. Limits min.–max.	USP Code	Qty.	Part No.
Apiezon® L	Chloroform	50–300°C	—	25g	**5017**
bis-(2-Ethoxyethyl) Adipate (BEEA)	Chloroform	150°C	—	25g	**5046**
Carbowax® 20M	Chloroform	60–225°C	G16	10g	**5264**
DC-200, 350 cstk (Methyl)	Chloroform	20–250°C	—	100g	**5251**
OV™-101 (Methyl Fluid)	Chloroform	20–350°C	G1	20g	**5309**
SE-30 (Methyl Gum)	Chloroform	75–300°C	—	100g	**5271**
Sebaconitrile	Chloroform	150°C	—	20g	**5244**
Silar™ 10C (100% Cyanopropyl Silicone)[2]	Chloroform	50–250°C	G5	5g	**5250**
Tetrahydroxyethylethylene Diamine (THEED)	Methanol	125°C	—	25g	**5347**

[1]U.S. Patent #3,239,997, [2]U.S. Patent #4,063,911.

Custom Coated Packings

Additional Stationary Phases for Custom Packings and Columns

Table 4—Stationary Phases		
AT™-1000	bis-(2-Ethoxyethyl) Sebacate (BEES)	OV™-351
Apiezon® H	Glycerin	Poly-A® 103
Apiezon® J	Halocarbon 25-55 Grease	Poly-A® 135
Apiezon® K	Halocarbon Oil 14-25	Poly-I 110
Apiezon® N	Hexadecanol	Poly-S 176
BBBT	Hi-EFF™ 1AP (Diethyleneglycol Adipate)	Polyox 600M
Bentone 34	Hi-EFF™ 2AP (Ethyleneglycol Adipate)	Polyvinylpyrrolidone
BHXBT	Hi-EFF™ 2BP (Ethyleneglycol Succinate)	Reoplex 400
BMBT	Hi-EFF™ 3BP (Neopentylglycol Succinate)	SE™-52
BMEA	Hi-EFF™ 3CP (Neopentylglycol Sebacate)	SF-96
Carbowax® 540	Hi-EFF™ 8AP (Cyclohexanedimethanol Adipate)	Sorbitol
Carbowax® 600	Igepal® CO-880	SPAN 80
Carbowax® 1000	Igepal® CO-990	Squalane
Carbowax® 1450	Kel-F® Oil No. 3	SUPEROX® 4
Carbowax® 20M-TPA	Kel-F® Oil No. 10	SUPEROX® 20M
CS-10	Kel-F® Wax	TCEPE
N,N-bis-(2-Cyanoethyl) formamide (BCEF)	Krytox® 143AD	TCEP
DC-200 (500cstk)	LAC 3-R-728	β,β-Thiodipropionitrile
DC-410	LAC 4-R-886	Triton® X-100
DC-550	LAC 5-R-737	Triton® X-305
DC-702	Lexan (Polycarbonate Resin)	TWEEN 80
Di-n-butyl Maleate	Neopentylglycol Succinate	UC L-45
Didecyl Phthalate	Octyldecyl Adipate	UCON 50-HB-280-X
Di(2-ethylhexyl) Sebacate	OV™-7	UCON 75-H-90,000
Di(2-ethylhexyl) Phthalate	OV™-17 Vinyl	UCON LB-135
Diglycerol	OV™-22	UCON LB-1715
Diisodecyl Phthalate	OV™-105	UCON LB-550X
Dimethyl Sulfolane	OV™-202	UCON LB-1800-X
Dinonyl Phthalate	OV™-210	UC W-98
ECNSS-M	OV™-215	Versamid® 900
EGSS-X	OV™-225	Versilube® F-50
Ethofat 60-25	OV™-330	Versilube® F-50

Additional Charges for Custom Coated Packings

Description	Part No.
Multiple Stationary Phases (per phase)	**C-2000**
Expensive Stationary Phases: Add the cost of the stationary phase used to base price	**—**
Acetone Washing	**C-2700**

technical assistance

Need help selecting the right packing for your analysis?

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

related products

Looking for GC packing accessories?

See pages 262–263.

5079 5075

GC Supports

Chromosorb® Diatomite Supports

Chromosorb® A, G, P, and W are available in both untreated and treated forms, as well as in a choice of various mesh ranges.

Chromosorb® Specifications

Chromosorb® Series	Type	Surface Area	Packed Density	Recommended Liquid Phase Load
A	Flux-calcined	2.7m²/g	0.48g/cc	25%
G	Flux-calcined	0.5m²/g	0.58g/cc	5%
P	Calcined	4.0m²/g	0.47g/cc	30%
W	Flux-calcined	1.0m²/g	0.24g/cc	15%
750	Flux-calcined	0.75m²/g	0.40g/cc	12%

Chromosorb® Treatment Specifications

Abbreviation	Treatments
NAW	Untreated (non-acid washed)
AW	Acid washed (HCL is used)
DMCS	Dimethyldichlorosilane (silanized)
HP	High performance QC'ed (acid washed, silanized, flux-calcined)

Chromosorb® Diatomite Supports

Description	Qty.	Part No.
Chromosorb® A-NAW		
20/30	454g	**2431**
Chromosorb® G-AW-DMCS		
45/60	225g	**23921**

Chromosorb® Diatomite Supports (continued)

Description	Qty.	Part No.
Chromosorb® P-NAW		
30/60	454g	**2304**
45/60	454g	**2305**
60/80	454g	**2306**
80/100	454g	**2307**
100/120	454g	**2308**
Chromosorb® P-AW		
30/60	454g	**2314**
45/60	454g	**2315**
60/80	454g	**2316**
80/100	454g	**2317**
Chromosorb® P-AW-DMCS		
80/100	454g	**2325**
100/120	454g	**2326**
Chromosorb® W-NAW		
30/60	150g	**23331**
45/60	150g	**23341**
60/80	150g	**23351**
80/100	150g	**23361**
100/120	150g	**23371**
Chromosorb® W-AW		
30/60	150g	**23451**
60/80	150g	**23471**
100/120	150g	**23491**
Chromosorb® W-AW-DMCS		
45/60	150g	**23581**
60/80	150g	**23591**
80/100	150g	**23601**
100/120	150g	**23611**
Chromosorb® W-HP		
80/100	150g	**23651**
100/120	150g	**23661**
120/140	150g	**24421**

Chromosorb® 750

- Designed specifically for biomedical and pesticide analyses

Chromosorb® 750 is the most inert and highly efficient support material in the series. This support material is acid-washed, DMCS treated, and carefully screened.

Chromosorb® 750

Description	Qty.	Part No.
80/100	100g	**2400**

GC Supports and Packings

Chromosorb® T

Chromosorb® T is a support material made from PTFE and is useful for the analysis of polar compounds such as water, hydrazine, sulfur dioxide, etc.

Chromosorb® T melts at 327°C, starts to decompose at 290°C, and fuses together under prolonged use at 250°C. The density is 0.42g/cc. The surface area is 7–8m^2/g and maximum loading capacity is 12%. When packing, chill the material below 19°C.

Chromosorb® T

Description	Qty.	Part No.
30/60	225g	**24371**

T-Port-F

T-Port-F is a screened tetrafluoroethylene support useful for analysis of very polar compounds. It has a density of about 0.5g/cc with a maximum temperature limit of 150°C.

T-Port-F

Description	Qty.	Part No.
30/60	50g	**2447**
80/100	50g	**2449**

Gas Chrom™

Gas Chrom™ Porous Polymers 220 and 254 are low in residual monomers and contaminants, condition faster and have lower column bleed.

Gas Chrom™ Specifications

	Gas Chrom™ 254	Gas Chrom™ 220
Pore Size:	3000nm	10nm
Surface Area:	1000m^2/g	450m^2/g
Equivalents:	Porapak® P	Porapak® Q

Gas Chrom™

Description	Qty.	Part No.
Gas Chrom™ Porous Polymer		
254, 80/100	25g	**2486**
Stock Packed Columns		
6ft x 1/8" SS Column with Gas Chrom™ Porous Polymer 220, 80/100	ea	**2484PC**
6ft x 1/8" SS Column with Gas Chrom™ Porous Polymer 254, 80/100	ea	**2486PC**

Activated Alumina

Activated alumina is useful for the analysis of light hydrocarbons. Unsaturated hydrocarbons are retained longer than saturated ones. Grade F-6 is an indicating alumina which turns from blue to pink upon adsorption of water. The maximum temperature limit is 300°C.

Activated Alumina

Description	Qty.	Part No.
Grade F-1		
60/80	100g	**5664**
80/100	100g	**5666**
Stock Packed Column		
5ft x 1/8" SS Packed with Alumina Grade F-1, 60/80	ea	**5664PC**

Glass Beads

Glass beads can be loaded up to 0.5 wt. % before becoming tacky. Two types are available: untreated (regular) or dimethyldichlorosilane (DMCS)-treated.

Glass Beads

Description	Qty.	Part No.
Regular, 60/80 mesh	125g	**5420**
Regular, 80/100 mesh	125g	**5422**
Regular, 100/120 mesh	125g	**5424**
DMCS Treated, 80/100 mesh	125g	**5428**
DMCS Treated, 100/120 mesh	125g	**5430**

GC Packings

Silica Gel

Silica Gel is used for the analysis of fixed gases and light hydrocarbons. It is also useful for dehydration of gases and liquids.

Grade 42 Indicating Silica Gel changes from blue to pink as it becomes saturated with water. It conforms to MIL-D-3716 Type IV Grade H. It will absorb water up to about 40% by weight. The maximum temperature limit is 350°C.

Silica Gel

Description	100g Part No.	1kg Part No.
Grade 12		
40/60	**5650**	**05532**
60/80	**5651**	**05533**
80/100	**5653**	**05534**
100/120	**5655**	**05535**
Grade 15		
35/60	**5648**	**05545**
Indicating Silica Gel, Grade 42		
6/16	**05559**	**05560**
Stock Packed Column		
18ft x 1/8" SS Packed with Silica Gel, 60/80, ea		**5651PC**

Unibeads™ S

The Unibeads™ S series consists of spherical porous silica beads. Unibeads™ 2S are comparable to Porasil® A. Unibeads™ 3S are similar to Porasil® B. The smaller the pore size, the greater the retention for hydrocarbons.

Unibeads™ S

Description	Qty.	Part No.
1S, 60/80, 22A	25g	**2752**
1S, 80/100, 22A	25g	**2758**
2S, 60/80, 60A	25g	**2760**
2S, 80/100, 60A	25g	**2762**
3S, 60/80, 100A	25g	**2764**
3S, 80/100, 100A	25g	**2766**
Stock Packed Column		
6ft x 1/8" SS Packed with Unibeads™ 1S, 60/80	ea	**2752PC**
6ft x 1/8" SS Packed with Unibeads™ 2S, 60/80	ea	**2760PC**

Chemipack® C18

Chemipack® C18 is a chemically bonded GC packing. Because it is bonded, it has high thermal stability, zero bleed and stability to water. These properties make it ideal for GC/MS or high sensitivity GC with any detector. The functional group bonded to the silica is octadecyl.

Chemipack®

Description	Qty.	Part No.
Chemipack® C18, 80/100, 320°C	15mL	**2768**
Stock Packed Column		
6ft x 1/8" SS Packed with Chemipack® C18, 80/100, 320°C	ea	**2768PC**

Carbosphere™—Carbon Molecular Sieve

Carbosphere™ exhibits properties similar to molecular sieves. It has a surface area of about 1000m²/g with a pore size of about 13Å. Carbosphere™ separates oxygen, nitrogen, methane, carbon monoxide, and carbon dioxide in the same run. It also separates air, carbon dioxide, and the C1–C2 hydrocarbons. At ambient temperatures, hydrogen will elute before oxygen.

Carbosphere™ resolves trace amounts of methane and acetylene in ethylene and even trace amounts of methane, acetylene, and ethylene in ethane. The carbon molecular sieves also separate oxides of nitrogen and sulfur. Because Carbosphere™ is very nonretentive for water, rapid separations of organics, such as formaldehyde and methanol in water are possible.

It is important to remove every trace of oxygen from the carrier gas used on Carbosphere™ columns. This is essential if you are doing trace analysis or using temperatures above 200°C. An oxygen purifier such as Oxy-Trap™ or Indicating Oxy-Trap™ is ideal for removal of oxygen from carrier gas. Carbosphere™ can be affected by contaminants in the air and in carrier gas. Store under pure nitrogen or argon gas.

Carbosphere™

Description	Qty.	Part No.
60/80	5g	**5680**
80/100	5g	**5682**
Stock Packed Columns		
6ft x 1/8" SS Packed with Carbosphere™, 60/80	ea	**5680PC**
6ft x 1/8" SS Packed with Carbosphere™, 80/100	ea	**5682PC**
10ft x 1/8" SS Packed with Carbosphere™, 80/100	ea	**56821PC**

related products

Need an oxygen trap?

See page 271.


4653

GC Packings

Molecular Sieves

- For drying applications

Molecular sieves are synthetic alkali metal alumino-silicates with various cations. They are used for the separation of fixed gases and drying of liquid or gas streams. They can be reactivated by heating at 250°C for 12 hours; 300°C for 4 hours; or 350°C for 2 hours.

Molecular Sieves

Description	100g Part No.	1kg Part No.
Molecular Sieve 3A		
1/8" Pellets	**05252**	**—**
1/16" Pellets	**05254**	**—**
40/60	**05306**	**—**
60/80	**05307**	**—**
80/100	**05308**	**—**
100/120	**05309**	**—**
Molecular Sieve 4A		
8/12 Beads	**05256**	**—**
1/8" Pellets	**05258**	**05259**
1/16" Pellets	**05260**	**05261**
40/60	**5620**	**—**
60/80	**5622**	**—**
80/100	**5624**	**—**
100/120	**5625**	**—**
Molecular Sieve 5A		
1/8" Pellets	**05264**	**—**
1/16" Pellets	**5633**	**—**
80/100	**5630**	**—**
100/120	**5632**	**—**
Molecular Sieve 13X		
8/12 Beads	**05268**	**—**
1/8" Pellets	**05270**	**05271**
1/16" Pellets	**05272**	**05273**
40/60	**5634**	**—**
60/80	**5636**	**—**
80/100	**5638**	**—**

Washed Molecular Sieves

- For chromatography applications

The usual gas chromatographic grades of molecular sieves have a fine dust adhering to each particle which cannot be removed simply by careful sieving. This dust is responsible for poorer separations and higher pressure drops than molecular sieves which are essentially dust-free.

The washed molecular sieves offered here have been carefully cleaned of dust particles by washing with distilled water. The cleaned product is then activated and sealed in glass jars. Molecular sieves are typically reactivated at a temperature of 300°C for four hours.

Washed Molecular Sieves

Description	Qty.	Part No.
Washed Molecular Sieve 5A		
40/60	50g	**5602**
60/80	50g	**5604**
80/100	50g	**5605**
100/120	50g	**5606**
Washed Molecular Sieve 13X		
40/60	50g	**57728**
60/80	50g	**57730**
80/100	50g	**57732**
100/120	50g	**57734**
Stock Packed Columns		
6ft x 1/8" SS Packed with 80/100 Washed 5A	ea	**5605PC**
6ft x 1/8" SS Packed with 80/100 Washed 13X	ea	**5773PC**

technical assistance

Contact Tech Support: Phone: 1.800.255.8324 (North America)
Email: contact.alltech@grace.com
Online: www.discoverysciences.com

Graphitized Carbon Blacks

Carbograph™ Packings

- High speed analysis
- Extremely hydrophobic—ideal for aqueous injections

Equivalent to the Carbopack™ packings. Carbograph™ packings can be modified with a stationary phase giving them unique selectivities.

Carbograph™ 1

Equivalent to Carbopack™ B. It has a surface area of 100m^2/g. Carbograph™ 1-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Carbograph™ 1SC

Similar to Carbopack™ BHT, specifically for the separation of sulfur compounds. It has a mesh of 40/60, and a maximum temperature of 225°C.

Carbograph™ 2

Equivalent to Carbopack™ C. It has a specific surface of 10m^2/g for the separation of volatile organic compounds. Carbograph™ 2-TD has a coarse mesh of 20/40 which is suitable for thermal desorption work. Maximum temperature 500°C.

Graphpac™-GC and -GB Packings

- Graphitized carbon
- Inert, non-specific surface
- Unique separation properties
- Optimized phase loading
- Hydrophobic—ideal for aqueous injections

Graphpac™-GC has an average surface area of 10–13m^2/g and interacts with samples almost completely by non-specific adsorption, which results in unique separations not achievable with fused silica open tubular (FSOT) capillary columns. Alcohols, hydrocarbons, and acids are separated in series according to carbon number.

The carbons possess partitioning capabilities as uncoated packings, use stationary phases to modify the selectivity of these carbons.

Carbograph™

Description	Qty.	Part No.
Uncoated		
Carbograph™ 1-TD, 20/40, >500°C	15g	**1740**
Carbograph™ 1, 60/80, >500°C	10g	**1722**
Carbograph™ 1 80/120, >500°C	10g	**1724**
Carbograph™ 2-TD, 20/40, >500°C	15g	**1745**
Carbograph™ 2, 60/80, >500°C	10g	**1726**
Carbograph™ 2, 80/100, >500°C	10g	**1728**
Carbograph™ 1-SC, 40/60, 225°C	10g	**1734**
Coated		
1% AT™-1000 on Carbograph™ 1 60/80, 225°C	15g	**1733**
0.1% AT™-1000 on Carbograph™ 2 80/100, 225°C	15g	**1737**
4% Carbowax® 20M on Carbograph™ 1 DA 80/120, 200°C	15g	**17271**
0.2% Carbowax® 1500 on Carbograph™ 2 60/80, 175°C	15g	**1725**
0.2% Carbowax® 1500 on Carbograph™ 2 80/100, 175°C	15g	**1720**
5% Carbowax® 20M on Carbograph™ 1 AW 80/120, 225°C	15g	**1729**
4% Carbowax® 20M + 0.8% KOH on Carbograph™ 1 60/80, 220°C	15g	**1735**

Graphpac™

Description	Qty.	Part No.
Graphpac™-GC		
Uncoated, 60/80	15g	**8536**
Uncoated, 80/100	15g	**8538**
Custom—Specify Phase and % Loading	15g	**C-2200**
Stock Packed Columns		
6ft x 1/8" SS Packed with 0.2% Carbowax® 1500, 175°C, 80/100	ea	**8546PC**

Porous Polymers

Tenax®-TA (GC) Polymers

- Stable baseline after conditioning
- Short retention times
- Low affinity for water
- Maximum temperature limit is 350°C

Tenax®-TA is a porous polymer that is based on 2,6-Diphenyl-p-phenylene Oxide. It has replaced Tenax®-GC. Tenax®-TA can be used as a packing and as a trapping material. Both the EPA and NIOSH specify the use of Tenax® in their standard methods. Tenax® is particularly useful for the analysis of high boiling compounds such as alcohols, polyethylene glycols, diols, phenols, monoamines and diamines, ethanolamines, aldehydes, ketones, and chlorinated aromatics.

Tenax®-TA (GC) Specifications	
Specific Surface Area:	35m²/g
Pore Volume:	2.4g/cc
Average Pore Size:	200nm
Density:	0.25g/cc

Tenax®-TA (GC)

Description	Qty.	Part No.
20/35	10g	**04914**
20/35	100g	**049141**
35/60	10g	**04915**
35/60	100g	**049151**
60/80	10g	**04916**
60/80	100g	**049161**
60/80	500g	**049162**
80/100	10g	**04917**
80/100	100g	**049171**
Pretreated Tenax®-TA		
Cleaned by Solvent Extraction	—	**C-4196**
Stocked Packed Columns		
6ft x 1/8" SS Packed with Tenax®-TA Porous Polymer, 60/80	ea	**4900PC**
6ft x 1/8" SS Packed with Tenax®-TA Porous Polymer, 80/100	ea	**4901PC**

Tenax®-GR Polymers

- Superior properties as trapping material
- Maximum temperature limit is 350°C

Tenax®-GR contains 23% graphitized carbon as an integral part of the material. This is not an admixture; the graphitized carbon is co-precipitated with the Tenax® polymer. The resulting material gives higher breakthrough volumes for most materials, yet is less water retentive than Tenax®-TA. When using this material for packing GC columns, better peak symmetry is observed. Surface area is 24.1m²/g.

Tenax®-GR

Description	Qty.	Part No.
20/35	10g	**4933**
20/35	100g	**49331**
35/60	10g	**4935**
60/80	10g	**4937**
60/80	500g	**49372**
80/100	10g	**4939**

tech tip

Conditioning

We highly recommend that Tenax®, like all other porous polymers, be preconditioned before being packed into GC columns. This removes most of the shrinkage of the polymer and minimizes the need for further conditioning. Tenax® can be expected to shrink further in use.

GC Packings

HayeSep® Porous Polymer

- Pre-purified porous polymers for GC
- Less bleed and shrinkage than other porous polymers
- Cleaned and conditioned to 200°C (165°C for N & T)

HayeSep® polymers were developed to solve room temperature separation of N_2, O_2, Ar and CO; ppm H_2O in the presence of HCl, Cl_2 etc. The HayeSep® D series better separates the fixed gases to the C_2 hydrocarbons.

HayeSep® Specifications

Series	Polymer Composition	Surface Area	Polarity
Q	DVB*	582m^2/g	Non-Polar
P	DVB*/Styrene	165m^2/g	Slightly Polar
R	DVB*/N-Vinyl-2-pyrrolidinone	344m^2/g	Moderately Polar
T	EGDM**	250m^2/g	Very Polar
N	DVB*/EGDM**	405m^2/g	Very Polar
A	DVB*/EGDM** (high purity)	526m^2/g	Moderately Polar
D	DVB* (high purity)	795m^2/g	Non-Polar

*Divinylbenzene. **Ethyleneglycoldimethacrylate.

Comparison of HayeSep® "D" Formulations†

Table 1—Retention Time (in minutes)

	Air	CH_4	CO_2	C_2H_2	C_2H_4	C_2H_6	H_2O
D	0.9	1.7	3.1	5.8	6.1	8.4	8.6
DOX	1.0	1.8	3.2	5.9	6.3	8.5	8.3
DB	0.9	1.6	3.1	6.1	6.6	8.7	8.1

†Retention data based on 10ft x 1/8" stainless steel at 45°C, 30mL/min.

HayeSep®

Description	Mesh	Temp. Limit max.	Qty.	Part No.
HayeSep® A	80/100	165°C	75cc	**2819**
	100/120	165°C	75cc	**2820**
	20/140	165°C	75cc	**2821**
HayeSep® D	60/80	290°C	75cc	**2828**
	80/100	290°C	75cc	**2829**
	100/120	290°C	75cc	**2830**

HayeSep® (continued)

Description	Mesh	Temp. Limit max.	Qty.	Part No.
HayeSep® DB	60/80	290°C	75cc	**2834**
	100/120	290°C	75cc	**2836**
HayeSep® N	60/80	165°C	75cc	**2815**
	80/100	165°C	75cc	**2816**
	100/120	165°C	75cc	**2817**
HayeSep® P	60/80	250°C	75cc	**2803**
HayeSep® Q	60/80	275°C	75cc	**2800**
	80/100	275°C	75cc	**2801**
HayeSep® R	60/80	250°C	75cc	**2806**
	80/100	250°C	75cc	**2807**
HayeSep® T	80/100	165°C	75cc	**2813**
Stock Packed Columns				
10ft x 1/8" SS Packed with HayeSep® D	100/120	290°C	ea	**28301PC**
20ft x 1/8" NI Packed with HayeSep® D	100/120	290°C	ea	**27082PC**
30ft x 1/8" SS Packed with HayeSep® D	100/120	290°C	ea	**27083PC**
30ft x 1/8" SS Packed with HayeSep® DB	100/120	290°C	ea	**2836PC**
8ft x 1/8" SS Packed with HayeSep® P	60/80	250°C	ea	**2803PC**
6ft x 1/8" SS Packed with HayeSep® P	80/100	250°C	75cc	**2804PC**
6ft x 1/8" SS Packed with HayeSep® Q	80/100	275°C	ea	**2801PC**
8ft x 1/8" SS Packed with HayeSep® Q	80/100	275°C	ea	**28010PC**
6ft x 1/8" SS Packed with HayeSep® T	80/100	165°C	ea	**2813PC**

GC Packings

Century Series Chromosorb®

Century Series Chromosorb® porous polymers have a rigid structure and distinct pore size. They are packed into columns in the normal manner and do not require a liquid coating. We recommend preconditioning all porous polymers before packing columns.

Chromosorb® Specifications

Series	Polymer Composition	Surface Area	Polarity
101	DVB*/Styrene	>50m²/g	Non-Polar
102	DVB*/Styrene	300–400m²/g	Slightly Polar
103	Cross-linked Polystyrene**	15–25m²/g	Non-Polar
106	Cross-linked Polystyrene	700–800m²/g	Non-Polar
107	Cross-linked Acrylic Ester	400–500m²/g	Polar

*Divinylbenzene. **The surface is basic.

Chromosorb®

Description	Mesh	Temp. Limit* max.	Qty.	Part No.
Chromosorb® 101	60/80	275/325°C	50g	**2405**
Chromosorb® 102	60/80	250/300°C	50g	**2408**
	80/100	250/300°C	50g	**2409**
Chromosorb® 103	80/100	250/300°C	50g	**2412**
Chromosorb® 106	60/80	250/275°C	50g	**2420**
Chromosorb® 107	80/100	250/275°C	50g	**2424**

*Isothermal/Temp. program.

Porapak®

Porapak® GC packings are cross-linked polymers which can be used directly in GC columns without a stationary phase coating. Acetone washing of Porapaks® improves performance.

Porapak® Specifications

Series	Polymer Composition	Surface Area	Polarity
Q	DVB*/Ethylvinylbenzene	500–600m²/g	Slightly Polar
P	DVB*/Styrene	100–200m²/g	Non-Polar
R	DVB*/Vinyl pyrrolidinone	450–600m²/g	Mod. Polar
S	DVB*/Vinyl pyridine	300–450m²/g	Mod. Polar
T	EGDM**	225–350m²/g	Polar
N	DVB*/Vinyl pyrrolidinone	250–350m²/g	Very Polar

*Divinylbenzene. **Ethyleneglycoldimethacrylate.

Porapak®

Description	Mesh	Temp. Limit max.	Qty.	Part No.
Porapak® Q	50/80	250°C	26g	**2700**
	80/100	250°C	26g	**2701**
	100/120	250°C	26g	**2702**
Porapak® P	50/80	250°C	20g	**2703**
	80/100	250°C	20g	**2704**
	100/120	250°C	20g	**2705**
Porapak® R	50/80	250°C	24g	**2706**
	80/100	250°C	24g	**2707**
	100/120	250°C	24g	**2708**
Porapak® S	50/80	250°C	26g	**2709**
	80/100	250°C	26g	**2710**
Porapak® T	50/80	190°C	31g	**2712**
	80/100	190°C	31g	**2713**
Porapak® N	50/80	190°C	29g	**2715**
	80/100	190°C	29g	**2716**
	100/120	190°C	29g	**2717**
Porapak® PS	80/100	250°C	20g	**2722**
	100/120	250°C	20g	**2723**

tech tip

Temperature limits

Our GC capillary columns are temperature rated. In some cases, we list two maximum operating temperatures, the lower one is for isothermal condition and the higher one for temperature-programmed condition.